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**REMARKS**

This reply is intended as a full and complete response to the Office Action mailed on November 25, 2003. In view of the amendments and following discussion, the Applicants believe that all claims are in allowable form.

**CLAIM REJECTIONS**

**A. 35 U.S.C. §112                      Claim 17**

Claim 17 is rejected under 35 U.S.C. §112 for not providing proper antecedent basis for the terms "the wafer" and "the substrate support". In response, the Applicants have amended claim 17 as indicated in the listing of claims. Specifically, the terms "the wafer" appearing in lines 7 and 11 have been replaced with "the substrate". Additionally, the term "a wafer support" in line 3 has been replaced with "a substrate support" correct said antecedent basis for the term "the substrate support" appearing in line 8. Claim 18 has been amended to agree with the changes to claim 17. Thus, the Applicants submit that claims 17-18 are now in allowable form and respectfully request that the rejection be withdrawn.

**B. 35 U.S.C. §103(a)                      Claims 1, 3, 5-9 and 13-15**

Claims 1, 3, 5-9 and 13-15 stand rejected as being unpatentable in view of United States Patent No. 4,423,701, issued January 3, 1984 to *Nath et al.*, (hereinafter referred to as "*Nath*") in view of United States Patent No. 6,497,767, issued December 24, 2002 to *Okase et al.* (hereinafter referred to as "*Okase*"). The Applicants respectfully disagree.

Independent claim 1 recites limitations not taught, shown or suggested by *Nath* and *Okase*. *Nath* teaches a deposition chamber having a vertically orientated cathode that splits the chamber into two adjacent and separate deposition regions. The position of the cathode fluidly isolates the deposition regions from each other (*i.e.*, the regions are "separate and distinct"), as there

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are no ap rtures or passages through which substances may cross the cathode. One substrate "guide" or support is fixed respectively on each side of the cathode, so that a substrate may be supported within either deposition region (or so that both regions may contain a substrate simultaneously). Substrates are supported on each guide in a vertical orientation (*i.e.*, the substrate is held parallel to the plane of the cathode). Thus, as the guides can not move the substrate between the deposition regions, *Nath* therefore does not teach, show or suggest a deposition chamber divided into two or more integrally connected deposition regions, the chamber having a wafer support disposed therein that is moveable between the two or more interconnected deposition regions, as recited by claim 1.

*Okase* teaches thermal processing unit having a heater at an upper end and a transfer port at a lower end. A substrate support is coupled to an elevator shaft that moves a substrate positioned on the substrate support between the upper end (for processing) and the lower end (for transfer). *Okase* teaches that a shutter 19 may be used to isolate the lower end of the unit from the heater so that thermal conduction may be "allowed or cut off" between the upper and lower end. *Okase* teaches the shutter is preferably hermetically sealed against the shaft during thermal processing, thereby isolating the deposition region from the transfer region. See, Col. 5, line 48 through Col. 6, line 15. *Okase* does not teach or suggest multiple deposition regions as the upper region is utilized for processing while the lower region is utilized for transferring.

The Examiner asserts that it would be obvious to utilize the vertically movable substrate support of *Okase* to move substrates between in the deposition chambers of *Nath*, thus rendering the invention of claim 1 obvious. The Applicants respectfully disagree.

The burden for establishing a *prima facie* case of obviousness falls on the Examiner. See, MPEP §2142. A basic requirement of establishing a *prima facie* case of obviousness is that the combination of prior art references must teach or suggest all of the claim limitations and that there must be a motivation to combine the references. See, §2143.

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Here, there is no motivation for combining the references in a manner that would teach or suggest all of the claim limitations. As discussed above, *Nath* teaches deposition chambers that are isolated by a cathode, that each deposition chamber has its own substrate support and that substrates are moved between the supports disposed in each chamber. *Okase* teaches a substrate support that moves the substrate through a shutter between a single deposition region and a transfer region. Thus, a modification of the deposition system of *Nath* with the teachings of *Okase* can only result in the use of the elevator of *Okase* being utilized to move the substrate from the deposition region of *Nath* to a transfer region, as *Nath* already provides for transferring substrates between individual substrate supports disposed in respective deposition chambers. Therefore the combination of *Nath* and *Okase* does not teach, show or suggest a deposition chamber divided into two or more integrally connected deposition regions, the chamber having a wafer support disposed therein that is moveable between the two or more interconnected deposition regions, as recited by claim 1.

Thus, the Applicants submit that independent claim 1, and claims 3, 5-9 and 13-15 that depends therefrom, are patentable over *Nath* in view of *Okase*. Accordingly, the Applicants respectfully request that the rejection to these claims be withdrawn.

## C. 35 U.S.C. §103(a)      Claims 17 and 19

Claims 17 and 19 stand rejected as being unpatentable over *Nath* in view of *Okase*. The Applicants respectfully disagree:

Independent claim 17 recites limitations not taught, shown or suggested by *Nath* and *Okase*. As discussed above, *Nath* teaches moving substrates between isolated deposition chambers having fixed supports. *Okase* teaches moving a substrate between a single processing region and a transfer region, where the processing and transfer regions are separated by a shutter. Thus, a modification of the deposition process of *Nath* with the teachings of *Okase* can only result in moving the substrate from the deposition region of *Nath* to a transfer region, as *Nath* alr ady provides for transferring substrates between

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individual substrate supports disposed in respective deposition chambers. Therefore the combination of *Nath* and *Okase* does not teach, show or suggest a method that includes the steps of positioning a substrate on a substrate support in a deposition chamber comprising a first deposition region and a second deposition region, wherein the first and second deposition regions are integrally connected to one another, depositing a first monolayer on the substrate disposed on the substrate support in the first deposition region, moving the wafer positioned on the substrate support to the second deposition region, and depositing a layer on the substrate in the second deposition region, as recited by claim 17.

Thus, the Applicants submit that independent claim 17, and claim 19 that depends therefrom, are patentable over *Nath* in view of *Okase*. Accordingly, the Applicants respectfully request that the rejection to these claims be withdrawn.

**D. 35 U.S.C. §103(a) Claim 2**

Claim 2 stands rejected as being unpatentable over *Nath* and *Okase*, in further view of U.S. Patent No. 5,518,542, issued May 21, 1996 to *Matsukawa et al.* (hereinafter referred to as "*Matsukawa*"). The Applicants respectfully disagree.

Independent claim 1, from which claim 2 depends, recites limitations not taught, shown or suggested by the combination of *Nath*, *Okase* and *Matsukawa*. The patentability of claim 1 over *Nath* and *Okase* has been discussed above. *Matsukawa* teaches a wafer cleaning apparatus having a wafer support that is vertically moveable by a piston. Thus, utilizing a piston as taught by *Matsukawa* in the elevator of *Okase* to modify the deposition system of *Nath* fails to teach or suggest a deposition chamber divided into two or more integrally connected deposition regions, the chamber having a wafer support disposed therein that is moveable between the two or more interconnected deposition regions, as recited by claim 1.

Thus, the Applicants submit that claim 2 that depends from independent claim 1 is patentable over *Nath* in view *Okase*, and in further view of *Matsukawa*.

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Accordingly, the Applicants respectfully request that the rejection to this claim be withdrawn.

**E. 35 U.S.C. §103(a)      Claims 4**

Claim 4 stands rejected as being unpatentable over *Nath* in view *Okase*, and in further view of U.S. Patent No. 6,387,185, issued May 14, 2002 to *Doering et al.* (hereinafter referred to as "*Doering*"). The Applicants respectfully disagree.

Independent claim 1, from which claim 4 depends, recites limitations not taught, shown or suggested by the combination of *Nath*, *Okase* and *Doering*. The patentability of claim 1 over *Nath* and *Okase* has been discussed above. *Doering* teaches an atomic layer deposition chamber in which an electrostatic chuck may be used to support a semiconductor wafer during processing. *Doering* does not teach or suggest processing a substrate in separate regions of a deposition chamber. Thus, utilizing an electrostatic chuck as taught by *Doering* to modify the deposition system of *Nath* and *Okase* fails to teach or suggest a deposition chamber divided into two or more integrally connected deposition regions, the chamber having a wafer support disposed therein that is moveable between the two or more interconnected deposition regions, as recited by claim 1.

Thus, the Applicants submit that claim 4 that depends from independent claim 1 is patentable over *Nath* in view *Okase*, and in further view of *Doering*. Accordingly, the Applicants respectfully request that the rejection to this claim be withdrawn.

**F. 35 U.S.C. §103(a)      Claim 18**

Claim 18 stands rejected as being unpatentable over *Nath* in view *Okase*, in further view of U.S. Patent No. 5,916,365, issued June 29, 1999 to *Sherman* (hereinafter referred to as "*Sherman*"). The Applicants respectfully disagree.

Independent claim 17, from which claim 18 depends, recites limitations not taught, shown or suggested by the combination of *Nath*, *Okase* and *Sherman*. The patentability of claim 17 over *Nath* and *Okase* has been discussed above.

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*Sherman* teaches an apparatus for sequential chemical vapor deposition by forming a first monolayer using a first reactant gas, then providing a second reactant gas that may react with the monolayer. This cycle may be repeated to grow a desired thickness of the film. *Sherman* performs this process of cycle exposure of the substrate to the first and second reactant gases in a single deposition chamber.

There is no suggestion to perform a portion of the cycle taught by *Sherman* in separate deposition regions. Moreover, there is not suggestion from *Nath* as to the desirability to split the deposition cycle taught by *Sherman* between individual chambers. Furthermore, neither *Nath*, *Okase* nor *Sherman* teach or suggest moving the substrate support between deposition chambers. Thus, performing the cyclic process of forming a monolayer (and growing the monolayer to a desired film thickness) as taught by *Sherman* in the deposition system of *Nath* and *Okase* fails to teach or suggest method that includes the steps of positioning a substrate on a substrate support in a deposition chamber comprising a first deposition region and a second deposition region, wherein the first and second deposition regions are integrally connected to one another, depositing a first monolayer on the substrate disposed on the substrate support in the first deposition region, moving the wafer positioned on the substrate support to the second deposition region, and depositing a layer on the substrate in the second deposition region, as recited by claim 17.

Thus, the Applicants submit that claim 18 that depends from independent claim 17 is patentable over *Nath* in view *Okase*, and in further view of *Sherman*. Accordingly, the Applicants respectfully request that the rejection to this claim be withdrawn.

**G. 35 U.S.C. §103(a) Claims 10 and 16**

Claim 10 stands rejected as being unpatentable over *Sherman* in view of *Nath*, and in further view of *Okase*. The Applicants respectfully disagree.

Independent claim 10 recites limitations not taught, shown or suggested by the combination of *Sherman*, *Nath* and *Okase*. As discussed above, there is

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no suggestion to perform a portion of the cycle taught by *Sherman* in separate deposition regions or a suggestion from *Nath* as to the desirability to split the deposition cycle taught by *Sherman* between individual chambers. Additionally, neither *Nath*, *Okase* nor *Sherman* teach or suggest move the substrate support between deposition chambers. Thus, performing the cyclic process of forming a monolayer (and growing the monolayer to a desired film thickness) as taught by *Sherman* in the deposition system of *Nath* and *Okase* fails to teach or suggest method that includes the steps of positioning a substrate on a wafer support in a deposition chamber comprising a first and second deposition region, wherein the first and second deposition regions are integrally connected to one another, and wherein the wafer support is movable between the first and second deposition regions, introducing a first deposition gas into the first deposition region and a second deposition gas into the second deposition region, moving the wafer support with the substrate thereon into the first deposition region wherein a first monolayer of the first deposition gas is chemisorbed onto the surface of the substrate, moving the wafer support with the substrate thereon into the second deposition region wherein a first monolayer of the second deposition gas is chemisorbed on the first monolayer of the first deposition gas, as recited by claim 10.

Thus, the Applicants submit that independent claim 10 and claim 16 depending thereon, are patentable over *Sherman* in view of *Nath*. Accordingly, the Applicants respectfully request that the rejection to these claims be withdrawn.

#### H. 35 U.S.C. §103(a) Claims 11-12

Claim 11-12 stands rejected as being unpatentable over *Sherman* in view of *Nath*, and in further view of *Okase*. The Applicants respectfully disagree.

Independent claim 11 recites limitations not taught, shown or suggested by the combination of *Sherman*, *Nath* and *Okase*. As discussed above, there is no suggestion to perform a portion of the cycle taught by *Sherman* in separate

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deposition regions or a suggestion from *Nath* as to the desirability to split the deposition cycle taught by *Sherman* between individual chambers. Additionally, neither *Nath*, *Okase* nor *Sherman* teach or suggest move the substrate support between deposition chambers. Thus, performing the cyclic process of forming a monolayer (and growing the monolayer to a desired film thickness) as taught by *Sherman* in the deposition system of *Nath* and *Okase* fails to teach or suggest computer storage medium that includes a software routine, that when executed, controls a processing chamber using a deposition method, the storage medium comprising the instruction steps of positioning a substrate on a wafer support in a deposition chamber comprising a first and second deposition region, wherein the first and second deposition regions are integrally connected to one another, and wherein the wafer support is movable between the first and second deposition regions, introducing a first deposition gas into the first deposition region and a second deposition gas into the second deposition region, moving the wafer support with the substrate thereon into the first deposition region wherein a first monolayer of the first deposition gas is chemisorbed onto the surface of the substrate, moving the wafer support with the substrate thereon into the second deposition region wherein a first monolayer of the second deposition gas is chemisorbed on the first monolayer of the first deposition gas, and repeating steps until a material layer having a desired thickness is achieved, as recited by claim 11.

Thus, the Applicants submit that independent claim 11, and claim 12 that depended therefrom, are patentable over *Sherman* in view of *Nath*, and in further view of *Okase*. Accordingly, the Applicants respectfully request that the rejection to these claims be withdrawn.

**NEW CLAIMS**

The Applicants have added new claims 20-41. The Applicants believe that the new claims are fully supported by the specification and that no new matter has been entered. The Applicants further believe that new claims 20-41

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are patentable over the art of record for at least the reasons presented above, and accordingly request allowance of these claims.

CONCLUSION

Thus, the Applicants submit that all claims now pending are in condition for allowance. Accordingly, both reconsideration of this application and swift passage to issue are earnestly solicited.

If the Examiner believes that any unresolved issues still exist, it is requested that the Examiner telephone Keith Taboada at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,

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Date

  
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Date of signature

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